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ABSTRACT

This paper explores the potential of telecommunications in education. It is proposed that classrooms begin telecomputing by communicating with "electronic pen pals," where students write for a distant audience and learn about different cultures through interaction on the computer. The following three sequential stages of the process are outlined: (1) getting acquainted with pen pals; (2) acting as resources for each other and discussion of common issues; and (3) collaborating on a project. The section on collaboration discusses electronic writing projects, electronic databases, and electronic debates. The use of telecommunications in the development of reading, writing, and collaborative research and problem-solving skills is examined. A telecommunications project that involved children writing for a real audience, conducted in a Withrow Elementary School (Stillwater, Minnesota) sixth grade class, is outlined. Benefits identified from involvement in telecommunications projects are development of literacy skills, personal and interpersonal skills, and development of global awareness. (MAS)

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Global Telecommunications Projects: Reading and Writing with the World

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Global Telecommunications/Teacher Exchange is a project located at the University of Wisconsin-River Falls where K-12 teachers and their students from Western Wisconsin and Eastern Minnesota are telecommunicating with classrooms in Russia and other countries.

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The Potential of Telecommunications

We are at the doorway of a massive technological explosion that will change the way we communicate and affect the way we lead our lives. Home communication centers will link us to the world with the flip of a switch and classrooms will echo these capabilities with easy access to people and information around the world. As we begin to hear about and use these telecommunication systems, we need to insure that our students are continuing to think and problem-solve and are not just passive listeners. We want our students to actively participate in the world and not just watch it go by.

As we stand at the doorway, we are just beginning to explore the effects of telecommunications on students' development of reading, researching, problem-solving, and writing ability. The idea of sharing written thoughts instantly with other students and teachers halfway around the world is a fascinating one. Once educators realize that all they need is a computer, a modem, the appropriate communications software, access to a telephone line, and access to another class that is similarly outfitted, they usually show great enthusiasm and commitment as they help their students complete projects using telecommunications. Teachers are rewarded by the high motivation they see in their students, as well as evidence of careful, reflective reading, and collaborative problem-solving as students conduct research online or in their community libraries, and a full application of the writing process as students compose their messages. Teachers are becoming convinced that global telecommunications projects in elementary classrooms are an excellent tool for integrating the reading, writing, arithmetic and reasoning, with all of the subject areas as students complete meaningful projects with students in other countries.

Telecommunications is the exchange of information at a distance via a computer, a communications software package, a modem, and a phone line. Examples of types of telecommunications are electronic mail (e-mail), bulletin boards, databases, graphics and even voice and video conferences. The most exciting uses of e-mail in K-12 education are for communication and collaboration between and among students and teachers located in the United States and around the world. Global on-line discussion groups allow users to communicate with people throughout the world who share a specific interest. For teachers this could mean a curriculum development meeting in a world-wide school. Telecommunications also offers free "electronic books" and subscription to "electronic journals", and allows users to access hundreds of catalogs of the world's best libraries, as well as a wide variety of databases for teaching and research. For example, Space Link is an easy- to-use database and interactive system containing information about NASA activities and Peacenet provides access to databases of press releases and research by 3000 peace and environment organizations including Greenpeace, Amnesty International and Teachers for Social Responsibility.

Telecommunication costs are now well within the budget of most schools. With simple equipment, teachers can access Internet, a vast international "global network of computer networks" that links thousands of users in more than 40 countries world wide. The main purpose of Internet is to connect research centers for the purposes of sharing information. When a K-

12 school is connected to a full-service worldwide network like the Internet, it immediately gains access to hundreds of millions of dollars of resources for a very small investment in hardware and software. Networks are a great equalizer; the most remote and smallest school can use the same service enjoyed by a large, urban university.

Once teachers have refined basic telecommunication skills, they can begin to explore different and more varied ways to integrate telecomputing activities into the curriculum. There are different purposes for classroom telecomputing, just as there are different purposes for oral and written communication: (a) to entertain, inform, instruct or persuade or (b) to obtain data in order to analyze, make comparisons, determine causation, to synthesize, and finally to form opinions.

A logical way to begin in telecomputing is by communicating with "electronic pen pals" where students write for a distant audience and learn about different cultures through interaction on the computer. There are three sequential stages to telecomputing: (a) Getting acquainted/Pen-Pals (b) acting as resources for each other and discussion of common issues of interest and (c) collaborating on a project.

a. Getting acquainted/Pen-Pals

With a few keystrokes, students and teachers can emerge in global dialogue with students and teachers, or practice written foreign language skills with native speakers in online discussion groups. However, people need to know something about each other before they become involved in projects. Before embarking on a telecommunications projects, teachers can have students research their families, neighborhoods and school in order to compile information for a letter introducing themselves to students in their matched class. They might also interview a classmate and then introduce the classmate to the network.

However, without focus on a specific topic, pen pal letters are hard to sustain. Responses to students' messages are sometimes slow. It may be that each student will not get an answer and some students may become disappointed. Also, each child may not always get a turn at the computer. Therefore, it is important that teachers are flexible enough to move the class toward a discussion of issues and a collaborative project as soon as s/he feels that there is a diminishing return of responses or that introductions have been completed.

b. Acquiring Information, Discussing Issues and Acting as a Resource

Next, students should focus on one or two issues by collecting information for their matched class and discussing the shared information within their local classroom and with the matched classroom. The students could provide more indepth descriptions of the history of their neighborhood or community. Travel guides, study maps, tourist attractions in their home state can be researched and described. Students can also compare aspects of culture, such as language differences, (e.g. proverbs, fables, idioms, figurative language) or differences in food, shelter, schooling, entertainment, music, etc. They might compare indigenous plants and animals, discuss career

aspirations, compare educational or political systems or analyze news coverage of a world event.

c. Project Organization and Use of Information: Collaboration

This is the real purpose and main goal of telecommunications. If a collaborative project is to be successful, students and their matched classes must (a) agree on a worthwhile project that involves active, meaningful participation, (b) divide the project into well specified tasks that can be assigned to groups or individuals withing each group. Individual and group accountability as well as class ownership of the tasks and project are necessary, (c) build or use databases for research, (d) exchange information about data within and across groups and classrooms, (e) arrive at a conclusion and form opinions and (f) have strong leadership within groups so that group communication, processing and evalution occurs.

Data that can be accessed or collected and exchanged might be information about the local conditions of air, water, soil, or about economic conditions such as the price for products on the agricultural market. Data about pollution control, conservation efforts, or recycling could be exchanged. Information about animal migration patterns, global temperatures, debate about current events, human relations, law, ethics and behavior could occur in classroom telecommunications projects. Following is a description of collaborative telecommunication projects that have been carried out in elementary classrooms:

Electronic writing projects have included collaborative plays and short stories and newspapers featuring local news. In one project, students become newsgatherers and reporters, editors, layout and graphic artists, and publishers.

In Bill Burrall's class, (Burrall, 1992) students first wrote a few paragraphs introducing themselves and providing a description of their likes and dislikes. Then they discussed and provided information about the area in which they live. They wrote about a typical week, local employment opportunities, current school fads and a sampling of food costs in their hometown.

Electronic databases allow students to experience hands-on community based ecological projects around the world. Students create databases and share local data, explore and manipulate databases of real research as they exchange messages about weather, water testing, acid rain and other ecological efforts.

For example, in the Illinois Rivers Project (Williams at ISUE) students tested water temperature and levels of phosphorus and nitrate in rivers, scanned for pollutants and environmental hazards. Findings were sent to US. Fish and Wildlife Service and resulted in the passing of some laws for pollution control.

Electronic debates can focus on issues of global peace, international political issues, ethics and politics. In an electronic debate project, teams are assigned a position, and then research both sides of the issue before debating. For example, in Bill Burrall's class's electronic debate project each school came up with rules to follow for maintaining global peace and a list of

consequences for non-compliance. Students perceived themselves as a government body with the power to make and enforce global rules. They met as a group to discuss hypothetical laws and deliberated consequences before coming up with choices.

In another collaborative project, students exchanged messages on how aspects of our everyday life would have to be redesigned to function in zero-gravity. The results were sent to NASA as ideas to help with new American space station. Other collaborative projects have included exchanges of information on video production and electronic music. Other projects include global climate simulations, or even space missions to other planets.

Telecommunications and the Development of Reading, Collaborative Research, Problem-solving and Writing Skills

At present, there is limited empirical evidence that telecommunications projects have a direct positive effect on students' literacy development, since telecommunications is regarded as a tool for communication and not as a method of instruction. One study, however, by Cohen and Riel (19??) focused on the effect of the sense of audience on the quality of writing when students were involved in a telecommunications project. They found that compositions written to students in another country as part of a telecommunications project received higher grades than those written to teachers, when the compositions were masked and rated by teachers. Therefore, it seemed that students wrote better compositions when writing to other students via telecommunications. Another study (Hunter, Riel, Bialo, and Levin, 19??) suggested that there is increased time spent in preparation, research, talking to peers and teachers and in actually writing when students are involved in telecommunications projects. Clearly, much more research needs to be done in this area.

But common sense and current knowledge of sound language arts instruction makes it obvious to most educators that telecommunications projects can enhance the basic skills of reading, collaborative research and problem-solving, and writing. Following is a discussion of how some of these skills can be enhanced.

Reading

In telecommunications projects, students must read messages very carefully. They must often reread responses several times in order to select important details and make decisions about their responses to messages. They also learn to rely on their ability to make inferences as students from other countries struggle with language and cultural differences. In face-to-face communications, students read body and facial expression. In telecommunications projects, students must read carefully to avoid misinterpretation. In a larger interpretation of the word "literacy" students gain "information literacy", or a basic understanding of how to navigate through and take full advantage of the networked world into which they will be entering upon graduation from high school in the 21st century.

Collaborative Research and Problem-solving

Once students have read their messages, they become focused on a problem to solve, whether that be answering pen-pal questions, discussing issues or conducting projects. Various levels of thinking and problem solving are required. .

Pen-Pals requires recollection and communication of personal data. Time and care in preparation of meaningful personal information will assure positive communication that will be understood. The greater the care, the greater the likelihood of an equally meaningful response.

Discussing issues and providing resource information requires the individual or group to research and define the issue, divide the tasks, collect data, prepare the data for communication in a meaningful manner and reflection on the communications sent and received.

Projects require intensive planning, organization and leadership. Projects require the teacher to prepare the groups to think, discuss, reflect on tasks and results, research, read, plan, write, collaborate with others and evaluate other group members. Excellent leadership and prior planning and organization by the teacher and group members can encourage visible, active collaboration, shared decision-making and a committed, long term relationship (Bagley and Hunter, 1992).

During project development, students (and teachers!) discover that they are responsible for, and in control of, their own learning. Students shift from memorizing facts to figuring out how to manipulate information. They pursue interdisciplinary learning and look at information in new ways. Additionally, in these projects, there is increased socialization and a sort of collective creativity. Teachers have noticed increased moral and emotional support as students increase in their ability to problem-solve.

The reality of communicating and working directly with a classroom in Moscow, getting to know the Russians and the life and culture via personal exchange empowers students to think about and learn about the country and the people. It empowers students to spend a great amount of time in researching and preparing their project and in teaching themselves and others about the topic selected.

Writing

The National Council of Teachers of English states that by experiencing and using language in a variety of contexts, students achieve personal growth: they respond to their experiences and learn about their world, their feelings, their attitudes and themselves (NCTE, 1982, p. 3) . In telecommunications projects, students experience a variety of opportunities to use language actively rather than passively. Students have a reason to communicate, they are writing for a real audience; hence the writing becomes much more meaningful.

When writing messages, students are able to experiment with styles of writing, often injecting humor, philosophical musings, information, persuasion, and even sarcasm into their messages. They soon learn that when

sending a message, brevity is important and they learn to summarize and delete trivial information that may confuse or distract the reader. They learn that new messages should reference prior messages and questions should be asked at the end of the writing. This is important because the reader will understand the new information in context of older messages and questions will not scroll off the screen to be lost if they appear at the end of the message. Most importantly,

> "Everyone involved must develop better than average communication skills. It is difficult enough to communicate our ideas in a face-to-face situation, let alone getting our point across to a group thousands of miles away through a computer link-up. (Burrall, 1992)."

A Telecommunications Project: Writing for a Real Audience

In Jan Hamlin's sixth grade class from Withrow Elementary, near Stillwater, Minnesota, all of the previously described components of a successful telecommunications project were evident. Part of a larger project which involved matching a team of Russian teachers and students with teachers and students in Western Wisconsin and Minnesota, Mrs. Hamlin and her class decided that they were ready to begin telecomputing. Following is a description of their project.

Weeks 1-2: Getting Acquainted

Mrs. Hamlin writes, "I explained that we would soon be telecommunicating with a class in Russia. I asked the students to list as much as they could about Russia. Our list looked like this:"

Gorbachev	country	splitting	poor	expensive food	very big
bear	wars	worn clothes		different language	cold
turmoil	Boris Yeltsin	Moscow		Dr. Zhivago	Communism

etc. etc.

We learned that we don't really know very much about Russia and are excited to be able to learn first-hand through our telecommunications. We then brainstormed ideas for projects. The students finally settled on these six ideas:

1. Put together a booklet of letters of introduction about ourselves. All students would participate.
2. Make a newspaper about our school. Five students were assigned.
3. Exchange ideas about the history of our towns. Take pictures and make a booklet about the development of our community. Five students were assigned.
4. Make a book describing some common English idioms. Seven students were assigned.
5. Participate in an acid ran project.
6. Participate in a temperature exchange project.

(During this time Mrs. Hamlin spent several hours working on the Macintosh to become familiar with the process of telecommunications, including

handling the telecommunications software, wordprocessing and the printing of messages.)

After some brainstorming, the students decided to write a five paragraph letter with their names, ages, grades and self descriptions; a description of their families, a description of their homes, their interests and hobbies and a little about their school. Rough drafts were peer-edited and proofed, and then checked by the teacher and decorated by the student. Mrs. Hamlin and the Russian teacher wrote letters as well.

Place Figure 1 and 1a about here

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and the Russian students responded!

Place Figure 2 about here

Weeks 2-7 : Acquiring Information, Discussing Issues and Acting as a Resource

The group projects/issues selected were: (a) the Newspaper as a vehicle to discuss and share information about Withrow Elementary, (b) the history of Stillwater, MN as a vehicle to compare communities and (c) a study of some English idioms as a vehicle to compare cultural similarities and differences. At this time Russian students (not from the matched class, but were exchanging with another classroom in the disctrict) visited with Mrs. Hamlin and her students.

While students were working on their letters (Getting Acquainted), Mrs. Hamlin was able to meet with each small group to go over the objectives, purpose, materials needed, procedures and aspects of a quality project for weeks 2-7. Teacher and students talked about, and agreed upon individual and group roles and responsibilities. They decided that the project groups would meet for 20 minutes each day to work on assignments and report progress to each other. Groups would meet with the teacher three times per week for review and assistance. Since Mrs. Hamlin knew in advance that Russian visitors would be arriving at this time, she decided to have the letters of introduction picturebook, the newspaper, the history of Stillwater project and the idioms hand-delivered to the matched class in Moscow. In that way she was able to include photographs and other graphics. Once this phase was completed and the results were given to the Russian visitors, the students began collecting acid rain and temperature data in preparation for telecomputing in weeks 8-11.

Place Figure 3 about here

The school newspaper was done with a software package called The Writing Center. Students included general information about elementary schools in the U. S. as well as descriptions of typical daily schedules at their school, a students' "favorites" section a word search game, and several articles.

Information in the history of Stillwater project included articles about the first residents in the area, one hundred fifty years ago, early lumber industries, the growth and development and a description of the present city. Students drew or found pictures to support their text.

The idiom project included various humorous sayings, like "Don't be a stick in the mud", or It's raining cats and dogs. Students also included the literal translations for these phrases.

Weeks 8-11: Collaborative Projects

The project selected by the teachers and students was acid rain, related temperature changes, the effect on the environment and what we can do about acid rain. The purpose of the acid rain project was to develop an understanding about how local and distant emissions of acid producing gases can affect the geographic distribution of acid rain. Students also investigated

what is being done in their state, country and in Russia about acid rain. Ms. Hamlin and the Russian teacher hoped that as a result, students would develop an understanding about what everyone could do about acid rain.

At the beginning of the project students developed a web to review what they knew about acid rain. They learned how to collect rain samples and measure the acidity. They also learned how to determine wind direction. The students also took temperature readings twice each day. They discussed probable reasons for fluctuations in temperature and they compared their temperatures with those in Moscow. Students telecomputed the data once each week.

Students and teachers embedded the data in the messages in friendly messages full of information and descriptions about what they were thinking, seeing and feeling in their communities. As a result, Jan Hamlin and her sixth grade students have compiled quite a collection of very interesting telecomputed messages. Probably one of the most memorable is from the Russian teacher. She wrote, "Dearest colleagues and friends, because teachers are friends all over the world. Thank you for your last message. Reading it, I can feel our mutual concern about pollution . . . ."

This message seemed to sum up the feelings about the project, that is when teachers, themselves, can cooperate with other teachers thousands of miles away, they are modeling cooperation. Only then do we have cooperative learning on a global scale. . .(Lake, 1988, p. 19).

Jan Hamlin's project was a successful one because she:
(a) planned the project and communicated the tasks carefully
(b) had access to computer hardware and software and technical support when she ran into obstacles.
(c) spent time on discussion and lessons before and after the computer was used
(d) created a project that was relatively inexpensive
(e) tied the project into the ongoing curriculum of **both** schools
(f) was able to provide a tremendous amount of leadership, time, energy and willpower
(g) helped the students to take ownership of their work, to be responsible group members and to get excited about the project
(h) Mrs. Hamlin became a facilitator. The students were involved in the process of teaching each other

Benefits from Involvement in Telecommunications Projects

1. Development of Literacy Skills

Students in these types of projects cannot help but improve in reading, collaborative research, problem-solving, and writing skills. They are highly motivated because they know that their writing is going to be read by real audiences in other countries. Telecommunications also increases skills in geography and computer literacy.

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2. Development of Personal and Interpersonal Skills

Students benefit personally from these types of projects in several ways. Teachers have noticed increased confidence and self-image. Some have reported that telecommunications have helped shy students to "open up". (Bruce & Rubin, 1984).

Students also increase in their ability to deal with frustration, definitely an attribute when one works with computers! Students learn to write concise paragraphs and sentences that communicate meaning. Students learn to convey expression and meaning through word usage and punctuation (for example, the use of "just kidding" after a joke or untruth or "I was VERY HAPPY!!!!!" to convey extreme joy and excitement). Finally, telecommunications projects develop in students the skill to work as part of a team within a class and with students from classes in another culture.

3. Development of Global Awareness

In telecommunications projects, students quickly learn that people from varied geographical locations perceive world problems and solutions differently. They become much more knowledgeable of international events, especially if these events are taking place in the country of their matched class. There is an increased student awareness of the emergence of a "global society".

Teachers, especially become excited about communicating with other teachers. As Bill Burall writes, "I, too found myself being motivated by the concept of being able to "talk" to teachers around the globe via computer (Burall, 1992).

Conclusion

Of course, there are certain requirements for successful telecommunications projects. These requirements include (a) access to a reliable computer network (b) strong leadership and professional interested on the part of teachers, (c) a well-specified tasks that requires active participation, (d) a sense of responsibility to the group and the task, with expectations of collaborations and cooperation, and (e) a final evaluation of the group task. It is also important to keep in mind that the computer is just one tool for learning. A computer cannot communicate the warm feelings about people, places, and events in history as related by a skilled, dedicated teacher who truly loves the subject. Exchanges of cultural items and picturebooks, video exchanges and class trips can add to the personalization and long term commitment to collaborative learning projects.

But computers can be doorways, (when they are not used as doorstops) allowing people easy access to other individuals in other countries around the world. (Solomon, 1992). We want our students to walk through the doorway to participate in the world not just watch it on television. As Fred D'Ignazio (1987b) writes, " With telecommunications, distance is only a state of mind".

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